Appendix E

Boring Logs

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Area 1, Building 41	Boring Name: 2BB-1-6
DRILLING COMPANY: Water Development	DRILLER: Gary Whitley
DRILLING METHOD (S): CME-85, Hollow Stem Auger	DRILL BIT (S) SIZE: 8 inches
	Project Name: Douglas Aircraft
	Project Number: 974002.00
DEPTH TO WATER: Not Encountered	ELEVATION: Not Surveyed
	TOTAL DEPTH: 50.5 feet
LOGGED BY: D. Schneeberger	DATE STARTED: 4/17/97
	DATE COMPLETED: 4/17/97

SAMPLES Driven	SAMPLES Recovered	SAMPLES Collected	Penetration Resistance (blows/foot)	Head Space Reading (ppm)	Depth (feet)	Lithology	USCS Log	Munsell Color	SOIL DESCRIPTION AND DRILLING REMARKS
									Asphalt, 4"
			3 2 4	18.7			CL	5YR 3/2	Sandy CLAY: dark reddish brown, soft, moist, moderately plastic, medium to fine sand
			3 3 9	27.0	5				medium stiff, very moist
			3 4 10	18.7	10		ML	2.5YR 4/4	Clayey SILT: reddish brown, medium stiff, moist, moderately to slightly plastic
			3 4 10	177	20				
			3 5 11	239	30		CL	2.5YR 4/4	Silty CLAY: reddish brown, stiff, moist, slightly plastic, trace of fine sand
			3 5 12	231	40		ML	5YR 4/4	Clayey SILT: reddish brown, stiff, damp, moderately to slightly plastic, trace of fine sand

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Area 1, Building 41		Boring Name: 2BB-1-6	
DRILLING COMPANY: Water Development	DRILLER: Gary Whitley	Project Name: Douglas Aircraft	
DRILLING METHOD (S): CME-85, Hollow Stem Auger	DRILL BIT (S) SIZE: 8 inches	Project Number: 974002.00	
DEPTH TO WATER: Not Encountered		ELEVATION: Not Surveyed	TOTAL DEPTH: 50.5 feet
LOGGED BY: D. Schneeberger		DATE STARTED: 4/17/97	DATE COMPLETED: 4/17/97

SAMPLES: Driven	SAMPLES: Recovered	SAMPLES: Collected	SAMPLES: Penetration Resistance (blows/foot)	SAMPLES: Head Space Reading (ppm)	Depth (feet)	Lithology	USCS Log	Munsell Color	SOIL DESCRIPTION AND DRILLING REMARKS
					45		ML	5YR 4/4	Clayey SILT (continued): reddish brown, stiff, damp, moderately to slightly plastic, trace of fine sand
			3 6 14	1000	50		SP	2.5Y 5/6	SAND: light olive brown, medium dense, damp, fine, trace of silt
									Boring terminated at 50.5 feet.
					55				
					60				
					65				
					70				
					75				
					80				

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Area 1, Chemical Etching Area	Boring Name: 2BB-1-23
DRILLING COMPANY: Water Development	DRILLER: Gary Whitley
	Project Name: Douglas Aircraft
DRILLING METHOD (S): CME-85, Hollow Stem Auger	DRILL BIT (S) SIZE: 8 inches
	Project Number: 974002.00
DEPTH TO WATER: Not Encountered	ELEVATION: Not Surveyed
	TOTAL DEPTH: 50.5 feet
LOGGED BY: D. Schneeberger	DATE STARTED: 4/18/97
	DATE COMPLETED: 4/18/97

SAMPLES: Driven	SAMPLES: Recovered	SAMPLES: Collected	SAMPLES: Penetration Resistance (blows/foot)	SAMPLES: Head Space Reading (ppm)	Depth (feet)	Lithology	USCS Log	Munsell Color	SOIL DESCRIPTION AND DRILLING REMARKS
									Asphalt, 6"
■	■	■	2 7 9	0 2.0			CL	2.5YR N2.5/1	Silty CLAY: reddish black, medium stiff to stiff, moist, moderately plastic
■	■	■	8 5 9		5		CL	2.5YR N2.5/1	CLAY: reddish black, medium stiff, very moist, moderately to very plastic
■	■	■	4 5 7	14.5	10		ML	7.5YR 4/4	Clayey SILT: brown, medium stiff, moist, slightly plastic
■	■	■	3 3 6	14.5	20		ML	2.5YR 4/4	Clayey SILT: reddish brown, soft, moist, slightly plastic, trace of fine sand
■	■	■	12 8 16	27	30		CL	2.5YR 4/4	Silty CLAY: reddish brown, very stiff, damp, slightly to moderately plastic, trace of fine sand
■	■	■	3 5 8	52	40		SC	7.5YR 4/4	Clayey Fine SAND: brown, medium dense, moist, slightly plactic

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Area 1, Chemical Etching Area		Boring Name: 2BB-1-23	
DRILLING COMPANY: Water Development	DRILLER: Gary Whitley	Project Name: Douglas Aircraft	
DRILLING METHOD (S): CME-85, Hollow Stem Auger	DRILL BIT (S) SIZE: 8 inches	Project Number: 974002.00	
DEPTH TO WATER: Not Encountered		ELEVATION: Not Surveyed	TOTAL DEPTH: 50.5 feet
LOGGED BY: D. Schneeberger		DATE STARTED: 4/18/97	DATE COMPLETED: 4/18/97

SAMPLES: Driven	SAMPLES: Recovered	SAMPLES: Collected	SAMPLES: Penetration Resistance (blows/foot)	Head Space Reading (ppm)	Depth (feet)	Lithology	USCS Log	Munsell Color	SOIL DESCRIPTION AND DRILLING REMARKS
					45		ML	7.5YR 4/4	Clayey Fine SAND (continued): brown, medium dense, moist, slightly plastic
			4 12 17	35.4	50		SP	5YR 5/8	SAND: yellowish red, medium dense, moist to damp, fine, trace of silt
									Boring terminated at 50.5 feet.
					55				
					60				
					65				
					70				
					75				
					80				

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Supplemental Area Northeast	Boring Name: 2BB-SA-NE-2
DRILLING COMPANY: Water Development	DRILLER: Gary Whitley
DRILLING METHOD (S): CME-85, Hollow Stem Auger	DRILL BIT (S) SIZE: 8 inches
	Project Name: Douglas Aircraft
	Project Number: 974002.00
DEPTH TO WATER: Not Encountered	ELEVATION: Not Surveyed
	TOTAL DEPTH: 50.5 feet
LOGGED BY: D. Schneeberger	DATE STARTED: 4/16/97
	DATE COMPLETED: 4/16/97

SAMPLES Driven	SAMPLES Recovered	SAMPLES Collected	Penetration Resistance (blows/foot)	Head Space Reading (ppm)	Depth (feet)	Lithology	USCS Log	Munsell Color	SOIL DESCRIPTION AND DRILLING REMARKS
			5 17 15	22.9			ML	2.5Y 3/2	Asphalt, 3" Clayey SILT: very dark grayish brown, very stiff, moist, slightly plastic
			2 5 12	31.2	5		CL	2.5Y 3/2	Silty CLAY: very dark grayish brown, stiff, moist, moderately plastic
			2 6 13	56.2	10		CL	2.5Y 3/3	Sandy CLAY: dark olive brown, stiff, damp, slightly to moderately plastic, fine to medium sand
			4 4 6	81.2	20		SP	2.5Y 5/4	SAND: light olive brown, medium dense, damp, fine, trace of silt
			4 6 8	64.5	30		CL	10YR 5/3	Sandy CLAY: brown, medium stiff, moist, moderately plastic, fine sand
			4 5 9	52.0	40		SC	2.5Y 5/3	Clayey Fine SAND: light olive brown, medium stiff, moist, slightly plastic

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Supplemental Area Northeast	Boring Name: 2BB-SA-NE-2
DRILLING COMPANY: Water Development	DRILLER: Gary Whitley
DRILLING METHOD (S): CME-85, Hollow Stem Auger	DRILL BIT (S) SIZE: 8 inches
	Project Name: Douglas Aircraft
	Project Number: 974002.00
DEPTH TO WATER: Not Encountered	ELEVATION: Not Surveyed
	TOTAL DEPTH: 50.5 feet
LOGGED BY: D. Schneeberger	DATE STARTED: 4/16/97
	DATE COMPLETED: 4/16/97

SAMPLES: Driven	SAMPLES: Recovered	SAMPLES: Collected	SAMPLES: Penetration Resistance (blows/foot)	Head Space Reading (ppm)	Depth (feet)	Lithology	USCS Log	Munsell Color	SOIL DESCRIPTION AND DRILLING REMARKS
					45		SC	2.5Y 5/3	Clayey Fine SAND (continued): light olive brown, medium stiff, moist, slightly plastic
			6 18 19	35.4	50		SP	2.5Y 6/3	SAND: light yellowish brown, dense, moist, fine, trace of clay
					55				Boring terminated at 50.5 feet.
					60				
					65				
					70				
					75				
					80				

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Between buildings 29 and 33		Boring Name: 15	
DRILLING COMPANY: Maness	DRILLER: Pete	Project Name: DAC C-6 Parcel A Phase II	
DRILLING METHOD (S): Geoprobe	DRILL BIT (S) SIZE: 2 in.	Project Number: 954019.01	
DEPTH TO WATER: Not Encountered		ELEVATION:	TOTAL DEPTH: 26 ft.
LOGGED BY: J. Knight		DATE STARTED: 4/1/96	DATE COMPLETED: 4/1/96

SAMPLES: Driven	Recovered	Collected	Head Space Reading (mg/L)	Depth (feet)	Lithology	USCS Log	Munsell Color	SOIL DESCRIPTION AND DRILLING REMARKS
								Concrete, 4"
■		■	5.7	5		CL		Silty CLAY: dark brown, moist, some very fine sand
■		■	6.0	10		ML		Sandy SILT: brown, very fine sand, some clay, moist
■		■	5.4	15		ML		very fine to fine sand, no clay
■		■	6.2	20		CL		Silty CLAY: dark brown, moist, micaceous
■		■	6.4	25		ML		Sandy SILT: light brown, very fine sand, moist
								Boring Completed at 26 feet.
				30				
				35				
				40				

Appendix F

Parcel A Soil Screening Levels and Risk Calculations

HALEY & ALDRICH

Soil Screening Level Calculations

Table B-1. Site-specific Geotechnical Parameters at the BRC Former C-6 Facility

Sample ID	Date Sampled	Depth (feet bgs)	Sieve Analysis (Soil Type)	Dry Bulk Density (kg/L)	Moisture Content (percent by weight)	Total Porosity (fraction by volume)	Air-filled Porosity (fraction by volume)	Water-filled Porosity (fraction by volume)	TOC* (mg/kg)	f_{oc} (fraction by weight)
EIA290176-004 (I-34-20)	1/29/2001	20	Silt	1.54	17.5	0.42	0.15	0.27	330	0.0003
EIA290176-012 (D-29-20)	1/29/2001	20	Silt	1.55	17.0	0.41	0.15	0.26	430	0.0004
EIA29176-021 (I-25-20)	1/29/2001	20	Silt	1.37	20.2	0.48	0.20	0.28	410	0.0004
EIA290176-007 (I-34-50)	1/29/2001	50	Fine sand	1.35	4.4	0.51	0.45	0.06	230	0.0002
EIA29176-015 (D-29-50)	1/29/2001	50	Fine sand	1.36	19.5	0.49	0.22	0.26	560	0.0006
EIA29176-024 (I-25-50)	1/29/2001	50	Silt	1.34	24.3	0.51	0.18	0.32	470	0.0005
Average (25 feet bgs to groundwater table)				1.42		0.47	0.23	0.24		0.0004
Average (50 feet bgs to groundwater table)				1.35		0.50	0.28	0.22		0.0004

Notes:
The air-filled porosity values were calculated from gravimetric data, not volumetric data.

* f_{oc} = the weight fraction of organic carbon in soil = TOC/1,000,000

Table B-2. Soil Particle Size Distribution at BRC Former C-6 Facility

Sample ID	Date Sampled	Depth (feet bgs)	Sieve Analysis (Soil Type)	Median Grain Size (mm)	Particle Size Distribution, wt. Percent						
					Gravel	Sand Size				Silt	Clay
						Coarse	Medium	Fine	TOTAL		
EIA290176-004 (I-34-20)	1/29/2001	20	Silt	0.032	0.00	0.00	0.00	31.19	31.19	54.83	13.99
EIA290176-012 (D-29-20)	1/29/2001	20	Silt	0.036	0.00	0.00	0.90	27.59	28.49	59.67	11.85
EIA29176-021 (I-25-20)	1/29/2001	20	Silt	0.020	0.00	0.00	0.00	11.21	11.21	69.07	19.72
EIA290176-007 (I-34-50)	1/29/2001	50	Fine sand	0.151	0.00	0.00	0.57	79.33	79.90	17.39	2.71
EIA29176-015 (D-29-50)	1/29/2001	50	Fine sand	0.083	0.00	0.00	3.26	47.93	51.19	39.79	9.01
EIA29176-024 (I-25-50)	1/29/2001	50	Silt	0.027	0.00	0.00	0.04	21.27	21.31	64.99	13.70
Average (25 feet bgs to groundwater table)									37.22	50.96	11.83
Average (50 feet bgs to groundwater table)									50.80	40.72	8.47

Table B-3. Derivation of Soil Attenuation Factor for VOCs and Comparison of Maximum Soil Concentrations to Site-specific SSLs Calculated at 25 Feet Below Ground Surface

CAS No.	Chemical	MCL (mg/L)	K_{oc} [1,2]	f_{oc} [3]	K_d [4,5]	H' [1]	O_w [3]	O_a [3]	P_b [3]	Max. Residual Soil Concentration (mg/kg)	AF at D=15'	Site-specific SSL (mg/kg) at AF = 1	Site-specific SSL (mg/kg) at AF at D=15'	Site-specific SSL (mg/kg) at AF at D=15' and DAF=20	Max > SSL for at AF_T at D=15' and DAF=20?
12672-29-6	Aroclor-1248	5.00E-04	3.1E+05	4.05E-04	--	3.5E-02	2.4E-01	2.3E-01	1.42E+00	1.30E-01	19	6.29E-02	1.19E+00	2.39E+01	No
7440-38-2	Arsenic	5.00E-02	--	4.05E-04	2.90E+01	--	2.4E-01	2.3E-01	1.42E+00	4.50E+00	4	1.46E+00	6.43E+00	1.29E+02	No
7440-41-7	Beryllium	4.00E-03	--	4.05E-04	7.9E+02	--	2.4E-01	2.3E-01	1.42E+00	9.20E-01	119	3.16E+00	3.78E+02	7.55E+03	No
50-32-8	Benzo(a)pyrene	2.00E-04	7.87E+05	4.05E-04	--	1.87E-05	2.4E-01	2.3E-01	1.42E+00	1.30E+01	48	6.38E-02	3.07E+00	6.15E+01	No
117-81-7	Bis(2-ethylhexyl)phthalate	4.00E-03	1.5E+07	4.05E-04	--	4.2E-06	2.4E-01	2.3E-01	1.42E+00	2.30E+00	925	2.45E+01	2.26E+04	4.52E+05	No
16065-83-	Chromium (trivalent)	5.00E-02	--	4.05E-04	1.8E+06	--	2.4E-01	2.3E-01	1.42E+00	4.40E+01	272110	9.00E+04	2.45E+10	4.90E+11	No
7440-50-8	Copper	1.0E+00	--	4.05E-04	4.3E+02	--	2.4E-01	2.3E-01	1.42E+00	5.45E+01	65	4.28E+02	2.77E+04	5.54E+05	No
75-34-3	1,1-Dichloroethane (1,1-DCA)	5.00E-03	5.3E+01	4.05E-04	--	2.3E-01	2.4E-01	2.3E-01	1.42E+00	6.00E-02	7	1.15E-03	7.78E-03	1.56E-01	No
107-06-2	1,2-Dichloroethane (1,2-DCA)	5.00E-04	3.8E+01	4.05E-04	--	4.0E-02	2.4E-01	2.3E-01	1.42E+00	8.70E-03	7	9.66E-05	6.55E-04	1.31E-02	No
75-35-4	1,1-Dichloroethene (1,1-DCE)	6.00E-03	6.5E+01	4.05E-04	--	1.1E+00	2.4E-01	2.3E-01	1.42E+00	1.10E-01	7	2.24E-03	1.52E-02	3.04E-01	No
75-35-4	cis-1,2-DCE	6.00E-03	3.6E+01	4.05E-04	--	1.7E-01	2.4E-01	2.3E-01	1.42E+00	4.30E-02	7	1.28E-03	8.67E-03	1.73E-01	No
100-41-4	Ethylbenzene	3.00E-01	2.0E+02	4.05E-04	--	3.2E-01	2.4E-01	2.3E-01	1.42E+00	5.00E+00	7	9.10E-02	6.17E-01	1.23E+01	No
127-18-4	Tetrachloroethene (PCE)	5.00E-03	2.7E+02	4.05E-04	--	7.5E-01	2.4E-01	2.3E-01	1.42E+00	2.02E-01	7	2.00E-03	1.36E-02	2.72E-01	No
71-55-6	1,1,1-TCA	2.00E-01	1.4E+02	4.05E-04	--	7.1E-01	2.4E-01	2.3E-01	1.42E+00	1.35E-02	7	6.83E-02	4.63E-01	9.26E+00	No
79-00-5	1,1,2-TCA	5.00E-03	7.5E+01	4.05E-04	--	3.7E-02	2.4E-01	2.3E-01	1.42E+00	1.80E-02	7	1.04E-03	7.04E-03	1.41E-01	No
79-01-6	Trichloroethene (TCE)	5.00E-03	9.4E+01	4.05E-04	--	4.2E-01	2.4E-01	2.3E-01	1.42E+00	2.00E-01	7	1.38E-03	9.37E-03	1.87E-01	**Yes**
1330-20-7	Xylenes	1.75E+00	2.0E+02	4.05E-04	--	3.0E-01	2.4E-01	2.3E-01	1.42E+00	1.20E+01	7	5.25E-01	3.56E+00	7.13E+01	No

An SSL was not derived for chemicals that do not have promulgated primary MCLs. These chemicals were not included in the assessment of potential degradation to groundwater quality.

AF = Average attenuation factor based on site lithology (distance to groundwater = 40 feet, 37% sand, 51% silt, and 12% clay).

na = not available

K_{oc} = soil organic carbon-water partition coefficient (L/kg)

f_{oc} = site-specific organic carbon content of soil (kg/kg)

K_d = soil-water partition coefficient (L/kg), $K_{oc} \times f_{oc}$

H' = dimensionless Henry's law constant

O_w = site-specific average water-filled porosity (by volume)

O_a = site-specific average air-filled porosity (by volume)

P_b = dry soil bulk density (kg/L)

[1] Obtained from EPA Region 9 preliminary remediation goal (PRG) physical-chemical data for volatile organic compounds, November 2000

[2] Obtained from Risk Assessment Information System (RAIS) Toxicity & Chemical-Specific Factors Data Base, January 2001, http://risk.lsd.ornl.gov/cgi-bin/tox/TOX_select?select=csf

[3] Site-specific average values

[4] Obtained from EPA Soil Screening Guidance: Technical Background Document (TBD), EPA/540/R-95/128, July 1996, http://www.epa.gov/oerrpage/superfund/resources/soil/toc.htm

[5] Risk Assessment Information System (RAIS) Toxicity & Chemical-Specific Factors Data Base, January 2001, http://risk.lsd.ornl.gov/cgi-bin/tox/TOX_select?select=csf

Note: This calculation has been updated with the corrected concentration of bis(2-ethylhexyl)phthalate and concentrations detected in boring PL-B1.

Table B-4. Derivation of Soil Attenuation Factors for Non-VOCs at 25 Feet Below Ground Surface

CAS No.	Chemical	K_{oc} [1,2,4]	f_{oc} [3]	K_d [2,4]	H' [1]	O_w [3]	O_a [3]	P_b [3]	O_t	AF_{max}	Distance to Groundwater (feet)	AF_D	AF_T	**AF_T**
12672-29-6	Aroclor-1248	3.1E+05	4.1E-04	--	3.5E-02	2.43E-01	2.27E-01	1.42E+00	4.70E-01	734	40	73.38	19.01	19
7440-38-2	Arsenic	--	--	2.90E+01		2.43E-01	2.27E-01	1.42E+00	4.70E-01	170	40	17.03	4.41	4
7440-41-7	Beryllium	--	--	7.9E+02		2.43E-01	2.27E-01	1.42E+00	4.70E-01	4612	40	461.20	119.45	119
50-32-8	Benzo(a)pyrene	7.87E+05	4.1E-04	--	1.87E-05	2.43E-01	2.27E-01	1.42E+00	4.70E-01	1861	40	186.14	48.21	48
117-81-7	Bis (2-ethylhexyl)phthalate	1.5E+07	4.1E-04	--	4.2E-06	2.43E-01	2.27E-01	1.42E+00	4.70E-01	35696	40	3569.57	924.52	925
16065-83-	Chromium (trivalent)	--	--	1.8E+06		2.43E-01	2.27E-01	1.42E+00	4.70E-01	10506174	40	1050617.38	272109.90	272110
7440-50-8	Copper	--	--	4.3E+02		2.43E-01	2.27E-01	1.42E+00	4.70E-01	2499	40	249.91	64.73	65

na = not available

An AF_T was not derived for chemicals that do not have promulgated primary MCLs. These chemicals were not included in the assessment of potential further degradation to groundwater quality.

AFT were calculated assuming that the depth between chemical impacts and groundwater is 40 feet and that the soil within this portion of the soil column is comprised of 37% sand, 51% silt, and 12% clay.

K_{oc} = soil organic carbon-water partition coefficient (L/kg)

f_{oc} = site-specific organic carbon content of soil (kg/kg)

K_d = soil-water partition coefficient (L/kg), K_{oc} x f_{oc}

H' = dimensionless Henry's law constant

O_w = site-specific average water-filled porosity (by volume)

O_a = site-specific average air-filled porosity (by volume)

Ot = site-specific average total porosity (by volume)

P_b = dry soil bulk density (kg/L)

[1] Obtained from EPA Region 9 preliminary remediation goal (PRG) physical-chemical data for volatile organic compounds, November 2000

[2] Obtained from Risk Assessment Information System (RAIS) Toxicity & Chemical-Specific Factors Data Base, January 2001, http://risk.lsd.ornl.gov/cgi-bin/tox/TOX_select?select=csf

[3] Site-specific average values

[4] Obtained from EPA Soil Screening Guidance: Technical Background Document (TBD), EPA/540/R-95/128, July 1996, http://www.epa.gov/oerrpage/superfund/resources/soil/toc.htm

Table B-5. Derivation of Soil Attenuation Factor for VOCs and Comparison of Maximum Soil Concentrations to Site-specific SSLs Calculated at 40 Feet Below Ground Surface

CAS No.	Chemical	MCL (mg/L)	K_{oc} [1,2]	f_{oc} [3]	K_d [4,5]	H' [1]	O_w [3]	O_a [3]	P_b [3]	Max. Residual Soil Concentration (mg/kg)	AF at D=15'	Site-specific SSL (mg/kg) at AF = 1	Site-specific SSL (mg/kg) at AF at D=15'	Site-specific SSL (mg/kg) at AF at D=15' and DAF=20	Max > SSL for at AF_T at D=15' and DAF=20?
7440-38-2	Arsenic	5.00E-02	--	4.05E-04	2.90E+01	--	2.4E-01	2.3E-01	1.42E+00	2.30E+01	3	1.46E+00	4.16E+00	8.32E+01	No
7440-41-7	Beryllium	4.00E-03	--	4.05E-04	7.9E+02	--	2.4E-01	2.3E-01	1.42E+00	4.10E-01	75	3.16E+00	2.36E+02	4.73E+03	No
117-81-7	Bis(2-ethylhexyl)phthalate	4.00E-03	1.5E+07	4.05E-04	--	4.2E-06	2.4E-01	2.3E-01	1.42E+00	2.00E-01	578	2.45E+01	1.41E+04	2.83E+05	No
16065-83-	Chromium (trivalent)	5.00E-02	--	4.05E-04	1.8E+06	--	2.4E-01	2.3E-01	1.42E+00	5.10E+01	170069	9.00E+04	1.53E+10	3.06E+11	No
7440-50-8	Copper	1.0E+00	--	4.05E-04	4.3E+02	--	2.4E-01	2.3E-01	1.42E+00	3.30E+01	41	4.28E+02	1.74E+04	3.47E+05	No
100-41-4	Ethylbenzene	3.0E-01	2.0E+02	4.05E-04	--	3.2E-01	2.4E-01	2.3E-01	1.42E+00	2.00E+00	4	9.10E-02	3.91E-01	7.81E+00	No
75-35-4	1,1-Dichloroethene (1,1-DCE)	6.00E-03	6.5E+01	4.05E-04	--	1.1E+00	2.4E-01	2.3E-01	1.42E+00	3.50E-01	4	2.24E-03	9.61E-03	1.92E-01	**Yes**
71-55-6	1,1,1-TCA	2.00E-01	1.4E+02	4.05E-04	--	7.1E-01	2.4E-01	2.3E-01	1.42E+00	1.50E-02	4	6.83E-02	2.93E-01	5.86E+00	No
79-01-6	Trichloroethene (TCE)	5.00E-03	9.4E+01	4.05E-04	--	4.2E-01	2.4E-01	2.3E-01	1.42E+00	1.20E-01	4	1.38E-03	5.93E-03	1.19E-01	**Yes**
1330-20-7	Xylenes	1.75E+00	2.0E+02	4.05E-04	--	3.0E-01	2.4E-01	2.3E-01	1.42E+00	2.80E+01	4	5.25E-01	2.25E+00	4.51E+01	No

An SSL was not derived for chemicals that do not have promulgated primary MCLs. These chemicals were not included in the assessment of potential degradation to groundwater quality.

AF = Average attenuation factor based on site lithology (distance to groundwater = 25 feet, 37% sand, 51% silt, and 12% clay).

na = not available

K_{oc} = soil organic carbon-water partition coefficient (L/kg)

f_{oc} = site-specific organic carbon content of soil (kg/kg)

K_d = soil-water partition coefficient (L/kg), $K_{oc} \times f_{oc}$

H' = dimensionless Henry's law constant

O_w = site-specific average water-filled porosity (by volume)

O_a = site-specific average air-filled porosity (by volume)

P_b = dry soil bulk density (kg/L)

[1] Obtained from EPA Region 9 preliminary remediation goal (PRG) physical-chemical data for volatile organic compounds, November 2000

[2] Obtained from Risk Assessment Information System (RAIS) Toxicity & Chemical-Specific Factors Data Base, January 2001, http://risk.lsd.ornl.gov/cgi-bin/tox/TOX_select?select=csf

[3] Site-specific average values

[4] Obtained from EPA Soil Screening Guidance: Technical Background Document (TBD), EPA/540/R-95/128, July 1996, http://www.epa.gov/oerrpage/superfund/resources/soil/toc.htm

[5] Risk Assessment Information System (RAIS) Toxicity & Chemical-Specific Factors Data Base, January 2001, http://risk.lsd.ornl.gov/cgi-bin/tox/TOX_select?select=csf

Note: This calculation has been updated with the corrected concentration of bis(2-ethylhexyl)phthalate and concentrations detected in boring PL-B1.

Table B-6. Derivation of Soil Attenuation Factors for Non-VOCs at 40 Feet Below Ground Surface

CAS No.	Chemical	K_{oc} [1,2,4]	f_{oc} [3]	K_d [2,4]	H' [1]	O_w [3]	O_a [3]	P_b [3]	O_t	AF_{max}	Distance to Groundwater (feet)	AF_D	AF_T	**AF_T**
7440-38-2	Arsenic	--	--	2.90E+01		2.43E-01	2.27E-01	1.42E+00	4.70E-01	170	25	11.02	2.85	3
7440-41-7	Beryllium	--	--	7.9E+02		2.43E-01	2.27E-01	1.42E+00	4.70E-01	4612	25	288.63	74.75	75
117-81-7	Bis (2-ethylhexyl)phthalate	1.5E+07	4.1E-04	--	4.2E-06	2.43E-01	2.27E-01	1.42E+00	4.70E-01	35696	25	2231.36	577.92	578
16065-83-	Chromium (trivalent)	--	--	1.8E+06		2.43E-01	2.27E-01	1.42E+00	4.70E-01	10506174	25	656636.24	170068.79	170069
7440-50-8	Copper	--	--	4.3E+02		2.43E-01	2.27E-01	1.42E+00	4.70E-01	2499	25	156.57	40.55	41

na = not available

An AF_T was not derived for chemicals that do not have promulgated primary MCLs. These chemicals were not included in the assessment of potential further degradation to groundwater quality.

AFT were calculated assuming that the depth between chemical impacts and groundwater is 25 feet and that the soil within this portion of the soil column is comprised of 37% sand, 51% silt, and 12% clay.

K_{oc} = soil organic carbon-water partition coefficient (L/kg)

f_{oc} = site-specific organic carbon content of soil (kg/kg)

K_d = soil-water partition coefficient (L/kg), K_{oc} x f_{oc}

H' = dimensionless Henry's law constant

O_w = site-specific average water-filled porosity (by volume)

O_a = site-specific average air-filled porosity (by volume)

Ot = site-specific average total porosity (by volume)

P_b = dry soil bulk density (kg/L)

[1] Obtained from EPA Region 9 preliminary remediation goal (PRG) physical-chemical data for volatile organic compounds, November 2000

[2] Obtained from Risk Assessment Information System (RAIS) Toxicity & Chemical-Specific Factors Data Base, January 2001, http://risk.lsd.ornl.gov/cgi-bin/tox/TOX_select?select=csf

[3] Site-specific average values

[4] Obtained from EPA Soil Screening Guidance: Technical Background Document (TBD), EPA/540/R-95/128, July 1996, http://www.epa.gov/oerrpage/superfund/resources/soil/toc.htm

Table B-7. Derivation of Soil Attenuation Factor for VOCs and Comparison of Maximum Soil Concentrations to Site-specific SSLs Calculated at 50 Feet Below Ground Surface

CAS No.	Chemical	MCL (mg/L)	K_{oc} [1,2]	f_{oc} [3]	K_d [4,5]	H' [1]	O_w [3]	O_a [3]	P_b [3]	Max. Residual Soil Concentration (mg/kg)	AF at D=15'	Site-specific SSL (mg/kg) at AF = 1	Site-specific SSL (mg/kg) at AF at D=15'	Site-specific SSL (mg/kg) at AF at D=15' and DAF=20	Max > SSL for at AF_T at D=15' and DAF=20?
7440-38-2	Arsenic	5.00E-02	--	4.05E-04	2.90E+01	--	2.4E-01	2.3E-01	1.42E+00	2.30E+01	2	1.46E+00	2.32E+00	4.63E+01	No
7440-41-7	Beryllium	4.00E-03	--	4.05E-04	7.9E+02	--	2.4E-01	2.3E-01	1.42E+00	4.10E-01	40	3.16E+00	1.25E+02	2.50E+03	No
117-81-7	Bis(2-ethylhexyl)phthalate	4.00E-03	1.5E+07	4.05E-04	--	4.2E-06	2.4E-01	2.3E-01	1.42E+00	1.30E-01	317	2.45E+01	7.75E+03	1.55E+05	No
16065-83-	Chromium (trivalent)	5.00E-02	--	4.05E-04	1.8E+06	--	2.4E-01	2.3E-01	1.42E+00	5.10E+01	89860	9.00E+04	8.09E+09	1.62E+11	No
7440-50-8	Copper	1.0E+00	--	4.05E-04	4.3E+02	--	2.4E-01	2.3E-01	1.42E+00	3.30E+01	22	4.28E+02	9.21E+03	1.84E+05	No
75-35-4	1,1-Dichloroethene (1,1-DCE)	6.00E-03	6.5E+01	4.05E-04	--	1.1E+00	2.4E-01	2.3E-01	1.42E+00	1.60E-01	2	2.24E-03	4.77E-03	9.55E-02	**Yes**
71-55-6	1,1,1-TCA	2.00E-01	1.4E+02	4.05E-04	--	7.1E-01	2.4E-01	2.3E-01	1.42E+00	1.50E-02	2	6.83E-02	1.45E-01	2.91E+00	No
79-01-6	Trichloroethene (TCE)	5.00E-03	9.4E+01	4.05E-04	--	4.2E-01	2.4E-01	2.3E-01	1.42E+00	1.10E-01	2	1.38E-03	2.94E-03	5.89E-02	**Yes**

An SSL was not derived for chemicals that do not have promulgated primary MCLs. These chemicals were not included in the assessment of potential degradation to groundwater quality.

AF = Average attenuation factor based on site lithology (distance to groundwater = 15 feet, 51% sand, 41% silt, and 8% clay).

na = not available

K_{oc} = soil organic carbon-water partition coefficient (L/kg)

f_{oc} = site-specific organic carbon content of soil (kg/kg)

K_d = soil-water partition coefficient (L/kg), K_{oc} x f_{oc}

H' = dimensionless Henry's law constant

O_w = site-specific average water-filled porosity (by volume)

O_a = site-specific average air-filled porosity (by volume)

P_b = dry soil bulk density (kg/L)

[1] Obtained from EPA Region 9 preliminary remediation goal (PRG) physical-chemical data for volatile organic compounds, November 2000

[2] Obtained from Risk Assessment Information System (RAIS) Toxicity & Chemical-Specific Factors Data Base, January 2001, http://risk.lsd.ornl.gov/cgi-bin/tox/TOX_select?select=csf

[3] Site-specific average values

[4] Obtained from EPA Soil Screening Guidance: Technical Background Document (TBD), EPA/540/R-95/128, July 1996, http://www.epa.gov/oerrpage/superfund/resources/soil/toc.htm

[5] Risk Assessment Information System (RAIS) Toxicity & Chemical-Specific Factors Data Base, January 2001, http://risk.lsd.ornl.gov/cgi-bin/tox/TOX_select?select=csf

Note: This calculation has been updated with the corrected concentration of bis(2-ethylhexyl)phthalate.

Table B-8. Derivation of Soil Attenuation Factors for Non-VOCs at 50 Feet Below Ground Surface

CAS No.	Chemical	K_{oc} [1,2,4]	f_{oc} [3]	K_d [2,4]	H' [1]	O_w [3]	O_a [3]	P_b [3]	O_t	AF_{max}	Distance to Groundwater (feet)	AF_D	AF_T	**AF_T**
7440-38-2	Arsenic	--	--	2.90E+01		2.16E-01	2.85E-01	1.35E+00	5.01E-01	182	15	7.46	1.59	2
7440-41-7	Beryllium	--	--	7.9E+02		2.16E-01	2.85E-01	1.35E+00	5.01E-01	4939	15	185.82	39.58	40
117-81-7	Bis (2-ethylhexyl)phthalate	1.5E+07	4.20E-04	--	4.2E-06	2.16E-01	2.85E-01	1.35E+00	5.01E-01	39639	15	1487.07	316.75	317
16065-83-	Chromium (trivalent)	--	--	1.8E+06		2.16E-01	2.85E-01	1.35E+00	5.01E-01	11250001	15	421875.66	89859.52	89860
7440-50-8	Copper	--	--	4.3E+02		2.16E-01	2.85E-01	1.35E+00	5.01E-01	2676	15	100.98	21.51	22

na = not available

An AF_T was not derived for chemicals that do not have promulgated primary MCLs. These chemicals were not included in the assessment of potential further degradation to groundwater quality.

AFT were calculated assuming that the depth between chemical impacts and groundwater is 15 feet and that the soil within this portion of the soil column is comprised of 51% sand, 41% silt, and 8% clay.

K_{oc} = soil organic carbon-water partition coefficient (L/kg)

f_{oc} = site-specific organic carbon content of soil (kg/kg)

K_d = soil-water partition coefficient (L/kg), K_{oc} x f_{oc}

H' = dimensionless Henry's law constant

O_w = site-specific average water-filled porosity (by volume)

O_a = site-specific average air-filled porosity (by volume)

Ot = site-specific average total porosity (by volume)

P_b = dry soil bulk density (kg/L)

[1] Obtained from EPA Region 9 preliminary remediation goal (PRG) physical-chemical data for volatile organic compounds, November 2000

[2] Obtained from Risk Assessment Information System (RAIS) Toxicity & Chemical-Specific Factors Data Base, January 2001, http://risk.lsd.ornl.gov/cgi-bin/tox/TOX_select?select=csf

[3] Site-specific average values

[4] Obtained from EPA Soil Screening Guidance: Technical Background Document (TBD), EPA/540/R-95/128, July 1996, http://www.epa.gov/oerrpage/superfund/resources/soil/toc.htm

Table B-10. Derivation of Estimated Maximum VOC Concentrations in Groundwater at Parcel A Using a Site-specific SSL Equation

CAS No.	Chemical	Max. Residual Soil Concentration (mg/kg)	K_{oc} [1]	f_{oc} [2]	K_d [3]	H' [1]	O_w [2]	O_a [2]	P_b [2]	Pore Water Conc. (mg/L)	Groundwater Conc. (mg/L) = Pore Water Conc. / AF / DAF
104-51-8	n-Butylbenzene	3.10E+00	2.8E+03	4.05E-04	--	5.4E-01	2.4E-01	2.3E-01	1.42E+00	2.2E+00	1.1E-01
75-34-3	1,1-DCA	6.00E-02	5.3E+01	4.05E-04	--	2.3E-01	2.4E-01	2.3E-01	1.42E+00	2.6E-01	1.3E-02
107-06-2	1,2-DCA	8.70E-03	3.8E+01	4.05E-04	--	4.0E-02	2.4E-01	2.3E-01	1.42E+00	4.5E-02	2.3E-03
75-35-4	1,1-DCE	3.50E-01	6.5E+01	4.05E-04	--	1.1E+00	2.4E-01	2.3E-01	1.42E+00	9.4E-01	4.7E-02
540-59-0	1,2-DCE	6.10E-03	3.7E+01	4.05E-04	--	2.9E+00	2.4E-01	2.3E-01	1.42E+00	9.5E-03	4.7E-04
156-59-2	cis-1,2-DCE	4.30E-02	3.6E+01	4.05E-04	--	1.7E-01	2.4E-01	2.3E-01	1.42E+00	2.0E-01	1.0E-02
100-41-4	Ethylbenzene	5.00E+00	2.0E+02	4.05E-04	--	3.2E-01	2.4E-01	2.3E-01	1.42E+00	1.6E+01	8.2E-01
127-18-4	PCE	2.02E-01	2.7E+02	4.05E-04	--	7.5E-01	2.4E-01	2.3E-01	1.42E+00	5.0E-01	2.5E-02
103-65-1	n-Propylbenzene	2.50E+00	2.8E+03	4.05E-04	--	5.4E-01	2.4E-01	2.3E-01	1.42E+00	1.8E+00	9.0E-02
71-55-6	1,1,1-TCA	1.50E-02	1.4E+02	4.05E-04	--	7.1E-01	2.4E-01	2.3E-01	1.42E+00	4.4E-02	2.2E-03
79-00-5	1,1,2-TCA	1.80E-02	7.5E+01	4.05E-04	--	3.7E-02	2.4E-01	2.3E-01	1.42E+00	8.7E-02	4.3E-03
79-01-6	TCE	2.00E-01	9.4E+01	4.05E-04	--	4.2E-01	2.4E-01	2.3E-01	1.42E+00	7.2E-01	3.6E-02
95-63-6	1,2,4-TMB	4.50E+01	3.7E+03	4.05E-04	--	2.3E-01	2.4E-01	2.3E-01	1.42E+00	2.6E+01	1.3E+00
108-67-8	1,3,5-TMB	1.50E+01	8.2E+02	4.05E-04	--	3.2E-01	2.4E-01	2.3E-01	1.42E+00	2.7E+01	1.4E+00
108-88-3	Toluene	6.90E-01	1.4E+02	4.05E-04	--	2.7E-01	2.4E-01	2.3E-01	1.42E+00	2.5E+00	1.3E-01
1330-20-7	Xylene	2.80E+01	2.0E+02	4.05E-04	--	3.0E-01	2.4E-01	2.3E-01	1.42E+00	9.3E+01	4.7E+00

K_{oc} = soil organic carbon-water partition coefficient (L/kg)

f_{oc} = organic carbon content of soil (kg/kg)

K_d = soil-water partition coefficient (L/kg), K_{oc} x f_{oc}

H' = dimensionless Henry's law constant

O_w = site-specific average water-filled porosity (by volume)

O_a = site-specific average air-filled porosity (by volume)

P_b = dry soil bulk density (kg/L)

[1] Obtained from EPA Region 9 preliminary remediation goal (PRG) physical-chemical data for volatile organic compounds, November 2000

[2] Site-specific average values

[3] Obtained from EPA Soil Screening Guidance: Technical Background Document (TBD), EPA/540/R-95/128, dated July 1996, http://www.epa.gov/oerrpage/superfund/resources/soil/toc.htm

Note: This calculation includes updated maximum residual soil concentrations for 1,1-DCE and TCE and concentrations detected in boring PL-B1.

TABLE B-12
SUMMARY OF CUMMULATIVE RISK INCLUDING BORING PL-B1
FORMER C-6 FACILITY, PARCEL
LOS ANGELES, CALIFORNIA

	Onsite Construction Worker (Highest of AOPC 1 and AOPC 2)	Onsite Commercial/Industrial Worker (Highest of AOPC 1 and AOPC 2)	Onsite DTSC Commercial/Industrial Worker (Highest of AOPC 1 and AOPC 2)
Hazard Index			
Previously Estimated	0.051	0.000087	0.0046
Vapor Migration from Groundwater	NA	0.0024	0.0024
Vapor Migration from Deep Soil	NA	0.075	0.075
Vapor Migration from Deep Soil Leachate and Subsequent Volatilization from Groundwater	NA	0.0082	0.0082
Total	0.051	0.086	0.090
Excess Cancer Risk			
Previously Estimated	1.4E-06	1.7E-10	4.4E-06
Vapor Migration from Groundwater	NA	2.9E-06	2.9E-06
Vapor Migration from Deep Soil	NA	NA	NA
Vapor Migration from Deep Soil Leachate and Subsequent Volatilization from Groundwater	NA	7.0E-08	7.0E-08
Total	1.4E-06	3.0E-06	7.4E-06

NA = Not applicable
AOPC = Area of Potential Concern (Two areas of potential concern were identified for Parcel A in the post-demolition risk assessment.)

Vapor Migration Model Results

Deep Soil Leaching to Groundwater and Subsequent Volatilization to Indoor Air

SUMMARY OF VAPOR MIGRATION RESULTS - COMMERCIAL/LIGHT INDUSTRIAL SCENARIO
BRC Former C-6 Facility, Los Angeles, California
Deep Soil Leaching to Groundwater and Subsequent Volatilization to Indoor Air

Groundwater

CAS No.	Chemical	Estimated Concentration in Groundwater (ug/L)	Cancer Risk	Hazard Index
104-51-8	n-Butylbenzene	110	No Slope Factor	0.00010
75-34-3	1,1-Dichloroethane (1,1-DCA)	13	1.1E-10	0.00000037
107-06-2	1,2-Dichloroethane (1,2-DCA)	2.3	5.4E-11	0.000000019
75-34-3	1,1-Dichloroethylene (1,1-DCE)	47	6.8E-08	0.00005
156-59-2	cis-1,2-Dichloroethylene (cis 1,2-DCE)	10	No Slope Factor	0.0000030
100-41-4	Ethylbenzene	820	No Slope Factor	0.0000081
103-65-1	n-Propylbenzene	90	No Slope Factor	0.000086
127-18-4	Tetrachloroethene (PCE)	25	2.4E-09	0.000032
71-55-6	1,1,1-Trichloroethane	2.2	No Slope Factor	0.00000010
79-00-5	1,1,2-Trichloroethane	4.3	5.9E-11	0.00000073
79-01-6	Trichloroethlyene (TCE)	36	1.0E-09	0.0000016
95-63-6	1,2,4-Trimethylbenzene	1,300	No Slope Factor	0.0031
108-67-8	1,3,5-Trimethylbenzene	1,400	No Slope Factor	0.0046
108-88-3	Toluene	130	No Slope Factor	0.0000084
1330-20-7	Xylene	4,700	No Slope Factor	0.00012
	Total		7E-08	0.0082

Note: This calculation has been updated with concentrations of volatile organic compounds detected in PL-B1 as well as corrected concentrations of 1,1-dichloroethene and trichloroethene.

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Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: 1,1 - Dichloroethane (1,1-DCA)

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	9.90E+04	mg/mole
Vapor pressure	VP	=	3.08E-01	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	1.30E+01	ug/l
Henry's Law Constant	H	=	2.30E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**2.99E+00**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	2.30E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	5.30E+01	cm3/gm
Soil/water distribution coef.	K_d	=	**2.12E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 2.99E+00 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.40E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**5.94E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**3.23E-04**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**1.59E-06**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	**C_t**	=	**1.59E-06**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**1.85E-08**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**5.20E-08**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	5.20E-08	mg/kg-day
Reference dose	RfD	=	1.40E-01	mg/kg-day
Hazard Index	**HI**	=	**3.71E-07**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	1.85E-08	mg/kg-day
Slope factor (potency)	SF	=	5.70E-03	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**1.06E-10**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: 1,2-Dichloroethane (EDC)

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	9.90E+04	mg/mole
Vapor pressure	VP	=	1.14E-01	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	2.30E+00	ug/l
Henry's Law Constant	H	=	4.00E-02	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**9.20E-02**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	4.00E-02	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	3.80E+01	cm3/gm
Soil/water distribution coef.	K_d	=	**1.52E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 9.20E-02 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	1.00E-01	cm2/sec
Effective diffusion coefficient	**D_e**	=	**8.03E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**1.34E-05**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**6.63E-08**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	**C_t**	=	**6.63E-08**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**7.70E-10**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**2.16E-09**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	2.16E-09	mg/kg-day
Reference dose	RfD	=	1.14E-01	mg/kg-day
Hazard Index	**HI**	=	**1.89E-08**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	7.70E-10	mg/kg-day
Slope factor (potency)	SF	=	7.00E-02	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**5.39E-11**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: 1,1-Dichloroethylene (1,1-DCE)

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	9.70E+04	mg/mole
Vapor pressure	VP	=	7.78E-01	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	4.70E+01	ug/l
Henry's Law Constant	H	=	1.10E+00	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**5.17E+01**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	1.10E+00	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	6.50E+01	cm3/gm
Soil/water distribution coef.	K_d	=	**2.60E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 5.17E+01 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	9.00E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**7.22E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**6.79E-03**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**3.35E-05**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	**C_t**	=	**3.35E-05**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**3.90E-07**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**1.09E-06**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	1.09E-06	mg/kg-day
Reference dose	RfD	=	2.00E-02	mg/kg-day
Hazard Index	**HI**	=	**5.47E-05**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	3.90E-07	mg/kg-day
Slope factor (potency)	SF	=	1.75E-01	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**6.82E-08**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: cis-1,2-Dichloroethylene (cis 1,2-DCE)

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	9.70E+04	mg/mole
Vapor pressure	VP	=	2.40E-04	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	1.00E+01	ug/l
Henry's Law Constant	H	=	1.70E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**1.70E+00**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	1.70E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	3.60E+01	cm3/gm
Soil/water distribution coef.	K_d	=	**1.44E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 1.70E+00 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.40E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**5.94E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**1.83E-04**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**9.06E-07**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	**C_t**	=	**9.06E-07**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**1.05E-08**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**2.96E-08**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	2.96E-08	mg/kg-day
Reference dose	RfD	=	1.00E-02	mg/kg-day
Hazard Index	**HI**	=	**2.96E-06**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	1.05E-08	mg/kg-day
Slope factor (potency)	SF	=	0.00E+00	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**No Slope Factor**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: Tetrachloroethylene (PCE)

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	1.70E+05	mg/mole
Vapor pressure	VP	=	2.43E-02	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	2.50E+01	ug/l
Henry's Law Constant	H	=	7.50E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**1.88E+01**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	7.50E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	2.70E+02	cm3/gm
Soil/water distribution coef.	K_d	=	**1.08E+00**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 1.88E+01 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.20E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**5.78E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**1.97E-03**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**9.72E-06**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	**C_t**	=	**9.72E-06**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**1.13E-07**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**3.17E-07**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	3.17E-07	mg/kg-day
Reference dose	RfD	=	1.00E-02	mg/kg-day
Hazard Index	**HI**	=	**3.17E-05**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	1.13E-07	mg/kg-day
Slope factor (potency)	SF	=	2.10E-02	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**2.37E-09**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: 1,1,1-Trichloroethane (1,1,1-TCA)

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	1.30E+05	mg/mole
Vapor pressure	VP	=	1.63E-01	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	2.20E+00	ug/l
Henry's Law Constant	H	=	7.10E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**1.56E+00**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	7.10E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	1.40E+02	cm3/gm
Soil/water distribution coef.	K_d	=	**5.60E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 1.56E+00 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.80E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**6.26E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**1.78E-04**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**8.78E-07**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**

C. TOTAL INDOOR AIR CONCENTRATION C_t = **8.78E-07 mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**1.02E-08**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**2.86E-08**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	2.86E-08	mg/kg-day
Reference dose	RfD	=	2.86E-01	mg/kg-day
Hazard Index	**HI**	=	**1.00E-07**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	1.02E-08	mg/kg-day
Slope factor (potency)	SF	=	0.00E+00	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**No Slope Factor**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: 1,1,2 - TCA

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	1.30E+05	mg/mole
Vapor pressure	VP	=	3.10E-02	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	4.30E+00	ug/l
Henry's Law Constant	H	=	3.70E-02	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**1.59E-01**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	3.70E-02	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	7.50E+01	cm3/gm
Soil/water distribution coef.	K_d	=	**3.00E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 1.59E-01 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.80E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**6.26E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**1.81E-05**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**8.94E-08**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**

C. TOTAL INDOOR AIR CONCENTRATION C_t = **8.94E-08 mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**1.04E-09**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**2.92E-09**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	2.92E-09	mg/kg-day
Reference dose	RfD	=	4.00E-03	mg/kg-day
Hazard Index	**HI**	=	**7.29E-07**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	1.04E-09	mg/kg-day
Slope factor (potency)	SF	=	5.70E-02	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**5.92E-11**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: Trichloroethlyene (TCE)

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	1.30E+05	mg/mole
Vapor pressure	VP	=	7.61E-02	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	3.60E+01	ug/l
Henry's Law Constant	H	=	4.20E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**1.51E+01**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	4.20E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	9.40E+01	cm3/gm
Soil/water distribution coef.	K_d	=	**3.76E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 1.51E+01 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.90E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**6.34E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**1.74E-03**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**8.60E-06**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	**C_t**	=	**8.60E-06**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**1.00E-07**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**2.81E-07**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	2.81E-07	mg/kg-day
Reference dose	RfD	=	1.71E-01	mg/kg-day
Hazard Index	**HI**	=	**1.64E-06**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	1.00E-07	mg/kg-day
Slope factor (potency)	SF	=	1.00E-02	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**1.00E-09**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: n-butylbenzene

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	1.30E+05	mg/mole
Vapor pressure	VP	=	1.32E-03	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	1.10E+02	ug/l
Henry's Law Constant	H	=	5.40E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**5.94E+01**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	5.40E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	2.80E+03	cm3/gm
Soil/water distribution coef.	K_d	=	**1.12E+01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 5.94E+01 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.50E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**6.02E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**6.50E-03**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**3.21E-05**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**

C. TOTAL INDOOR AIR CONCENTRATION **C_t** = **3.21E-05** **mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**3.73E-07**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**1.05E-06**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	1.05E-06	mg/kg-day
Reference dose	RfD	=	1.00E-02	mg/kg-day
Hazard Index	**HI**	=	**1.05E-04**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	3.73E-07	mg/kg-day
Slope factor (potency)	SF	=	0.00E+00	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**No Slope Factor**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: Ethylbenzene

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	1.10E+05	mg/mole
Vapor pressure	VP	=	1.26E-02	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	8.20E+02	ug/l
Henry's Law Constant	H	=	3.20E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**2.62E+02**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	3.20E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	2.00E+02	cm3/gm
Soil/water distribution coef.	K_d	=	**8.00E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 2.62E+02 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.50E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**6.02E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**2.87E-02**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**1.42E-04**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**

C. TOTAL INDOOR AIR CONCENTRATION C_t = **1.42E-04** **mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**1.65E-06**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**4.62E-06**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	4.62E-06	mg/kg-day
Reference dose	RfD	=	5.71E-01	mg/kg-day
Hazard Index	**HI**	=	**8.09E-06**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	1.65E-06	mg/kg-day
Slope factor (potency)	SF	=	0.00E+00	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**No Slope Factor**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: n-propylbenzene

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	1.20E+05	mg/mole
Vapor pressure	VP	=	1.32E-03	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	9.00E+01	ug/l
Henry's Law Constant	H	=	5.40E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**4.86E+01**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	5.40E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	2.80E+03	cm3/gm
Soil/water distribution coef.	K_d	=	**1.12E+01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 4.86E+01 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.50E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**6.02E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**5.32E-03**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**2.63E-05**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**

C. TOTAL INDOOR AIR CONCENTRATION C_t = **2.63E-05** **mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**3.05E-07**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**8.56E-07**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	8.56E-07	mg/kg-day
Reference dose	RfD	=	1.00E-02	mg/kg-day
Hazard Index	**HI**	=	**8.56E-05**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	3.05E-07	mg/kg-day
Slope factor (potency)	SF	=	0.00E+00	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**No Slope Factor**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: 1,2,4 - Trimethylbenzene

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	1.20E+05	mg/mole
Vapor pressure	VP	=	2.76E-03	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	1.30E+03	ug/l
Henry's Law Constant	H	=	2.30E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**2.99E+02**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	2.30E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	3.70E+03	cm3/gm
Soil/water distribution coef.	K_d	=	**1.48E+01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 2.99E+02 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.50E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**6.02E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**3.27E-02**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**1.62E-04**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	**C_t**	=	**1.62E-04**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**1.88E-06**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**5.27E-06**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	5.27E-06	mg/kg-day
Reference dose	RfD	=	1.70E-03	mg/kg-day
Hazard Index	**HI**	=	**3.10E-03**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	1.88E-06	mg/kg-day
Slope factor (potency)	SF	=	0.00E+00	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**No Slope Factor**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: 1,3,5 - Trimethylbenzene

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	1.20E+05	mg/mole
Vapor pressure	VP	=	3.26E-03	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	1.40E+03	ug/l
Henry's Law Constant	H	=	3.20E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**4.48E+02**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	3.20E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	8.20E+02	cm3/gm
Soil/water distribution coef.	K_d	=	**3.28E+00**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 4.48E+02 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.50E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**6.02E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**4.90E-02**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**2.42E-04**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	**C_t**	=	**2.42E-04**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**2.81E-06**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**7.89E-06**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	7.89E-06	mg/kg-day
Reference dose	RfD	=	1.70E-03	mg/kg-day
Hazard Index	**HI**	=	**4.64E-03**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	2.81E-06	mg/kg-day
Slope factor (potency)	SF	=	0.00E+00	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**No Slope Factor**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: Toluene

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	9.20E+04	mg/mole
Vapor pressure	VP	=	3.74E-02	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	1.30E+02	ug/l
Henry's Law Constant	H	=	2.70E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**3.51E+01**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	2.70E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	1.40E+02	cm3/gm
Soil/water distribution coef.	K_d	=	**5.60E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 3.51E+01 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	8.70E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**6.98E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**4.45E-03**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**2.20E-05**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	**C_t**	=	**2.20E-05**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**2.56E-07**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**7.17E-07**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	7.17E-07	mg/kg-day
Reference dose	RfD	=	8.57E-02	mg/kg-day
Hazard Index	**HI**	=	**8.37E-06**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	2.56E-07	mg/kg-day
Slope factor (potency)	SF	=	0.00E+00	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**No Slope Factor**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: Xylenes

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	1.10E+05	mg/mole
Vapor pressure	VP	=	1.05E-02	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=	4.70E+03	ug/l
Henry's Law Constant	H	=	3.00E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**1.41E+03**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=		mg/kg
Henry's Law Constant	H	=	3.00E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	2.00E+02	cm3/gm
Soil/water distribution coef.	K_d	=	**8.00E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**0.00E+00**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 1.41E+03 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.00E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**5.62E-03**	cm2/sec
Depth of contamination or Csg	X	=	1.98E+01	m
Calculated Flux	**F_x**	=	**1.44E-01**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**7.11E-04**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**

C. TOTAL INDOOR AIR CONCENTRATION C_t = **7.11E-04** **mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**8.26E-06**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**2.32E-05**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	2.32E-05	mg/kg-day
Reference dose	RfD	=	2.00E-01	mg/kg-day
Hazard Index	**HI**	=	**1.16E-04**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	8.26E-06	mg/kg-day
Slope factor (potency)	SF	=	0.00E+00	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**No Slope Factor**	

CHEMICAL PARAMETERS

CAS No.		MW (mg/mole)		H' (dimension-less)		Da (cm^2/sec)		VP (atm)	Temp. (°C)		K_{oc} (cm^3/g)		Water Solubility (mg/L-water)		CSF (inh) ($(mg/kg-day)^{-1}$)		Chronic RfD (inh) (mg/kg-day)	
127-18-4	Tetrachloroethylene (PCE)	1.7E+05	a	7.5E-01	a	7.2E-02	a	2.4E-02	25	b	2.7E+02	a	2.0E+02	a	2.1E-02	c	1.0E-02	e
75-09-2	Methylene Chloride	8.5E+04	a	9.0E-02	a	1.0E-01	a	5.7E-01	25	b	1.0E+01	a	1.3E+04	a	3.5E-03	c	1.1E-01	e
67-66-3	Chloroform	1.2E+05	a	1.5E-01	a	1.0E-01	a	2.6E-01	25	b	5.3E+01	a	7.9E+03	a	1.9E-02	c	8.6E-02	e
95-63-6	1,2,4 - Trimethylbenzene	1.2E+05	a	2.3E-01	a	7.5E-02	a	2.8E-03	25	b	3.7E+03	a	2.6E-01	a	0.00E+00		1.70E-03	
78-93-3	Methyl Ethyl Ketone	7.2E+04	a	1.1E-03	a	9.0E-02	a	1.2E-01	25	b	4.5E+00	a	2.7E+05	a	0.00E+00		1.43E-01	
71-43-2	Benzene	7.8E+04	a	2.3E-01	a	8.8E-02	a	1.2E-01	25	b	6.2E+01	a	1.8E+03	a	1.00E-01		1.71E-02	
75-15-0	Carbon disulfide	7.6E+04	a	1.2E+00	a	1.0E-01	a	4.7E-01	25	b	4.6E+01	a	1.2E+03	a	0.00E+00		2.00E-01	
56-23-5	Carbon tetrachloride	1.5E+05	a	1.2E+00	a	7.8E-02	a	1.5E-01	25	b	1.5E+02	a	7.9E+02	a	1.50E-01		1.14E-02	
156-59-2	cis-1,2-Dichloroethylene (cis 1,2-DCE)	9.7E+04	a	1.7E-01	a	7.4E-02	a	2.4E-04	20	b	3.6E+01	a	3.5E+03	a	0.00E+00		1.00E-02	
100-41-4	Ethylbenzene	1.1E+05	a	3.2E-01	a	7.5E-02	a	1.3E-02	25	b	2.0E+02	a	1.7E+02	a	0.00E+00		5.71E-01	
98-82-8	Isopropyl-benzene (cumene, 1-methyethyl benzene)	1.2E+05	a	4.9E+01	a	7.5E-02	a	5.9E-03	25	b	2.2E+02	a	6.1E+01	a	0.00E+00		1.10E-01	
75-01-4	Vinyl chloride	6.3E+04	a	1.1E+00	a	1.1E-01	a	3.5E+00	25	b	1.9E+01	a	2.8E+03	a	2.70E-01		7.43E-03	
1330-20-7	Xylenes	1.1E+05	a	3.0E-01	a	7.0E-02	a	1.1E-02	25	b	2.0E+02	a	1.6E+02	a	0.00E+00		2.00E-01	
104-51-8	n-butylbenzene	1.3E+05	a	5.4E-01	a	7.5E-02	a	1.3E-03	23	d	2.8E+03	a	1.4E+01	a	0.00E+00		1.00E-02	
135-98-8	sec-butylbenzene	1.3E+05	a	7.7E-01	a	7.5E-02	a	1.4E-03	20	d	2.2E+03	a	1.7E+01	a	0.00E+00		1.00E-02	
103-65-1	n-propylbenzene	1.2E+05	b	5.4E-01	a	7.5E-02	a	1.3E-03	6.3	b	2.8E+03	a	1.4E+01	a	0.00E+00		1.00E-02	
108-88-3	Toluene	9.2E+04	a	2.7E-01	a	8.7E-02	a	3.7E-02	25	b	1.4E+02	a	5.3E+02	a	0.00E+00		8.57E-02	
156-60-5	trans-1,2-Dichloroethylene (trans-1,2-DCE)	9.7E+04	a	3.8E-01	a	7.1E-02	a	5.2E-01	30	b	3.8E+01	a	6.3E+03	a	0.00E+00		2.00E-02	
79-01-6	Trichloroethlyene (TCE)	1.3E+05	a	4.2E-01	a	7.9E-02	a	7.6E-02	20	b	9.4E+01	a	1.1E+03	a	1.00E-02		1.71E-01	
75-69-4	Trichlorofluoromethane (Freon 11)	1.4E+05	a	4.0E+00	a	8.7E-02	a	1.0E+00	25	b	1.6E+02	a	1.1E+03	a	0.00E+00		2.00E-01	
108-10-1	4-Methyl-2-pentanone (MIBK)	1.0E+05	a	5.7E-03	a	7.5E-02	a	2.6E-02	25	b	1.3E+02	a	1.9E+04	a	0.00E+00		2.29E-02	
108-67-8	1,3,5 - Trimethylbenzene	1.2E+05	a	3.2E-01	a	7.5E-02	a	3.3E-03	25	b	8.2E+02	a	5.0E+01	a	0.00E+00		1.70E-03	
75-34-3	1,1 - Dichloroethane (1,1-DCA)	9.9E+04	a	2.3E-01	a	7.4E-02	a	3.1E-01	25	b	5.3E+01	a	5.1E+03	a	5.70E-03		1.40E-01	
107-06-2	1,2-Dichloroethane (EDC)	9.9E+04	a	4.0E-02	a	1.0E-01	a	1.1E-01	25	b	3.8E+01	a	8.5E+03	a	7.00E-02		1.14E-01	
75-35-4	1,1-Dichloroethylene (1,1-DCE)	9.7E+04	a	1.1E+00	a	9.0E-02	a	7.8E-01	25	b	6.5E+01	a	2.3E+03	a	1.75E-01		2.00E-02	
71-55-6	1,1,1-Trichloroethane (1,1,1-TCA)	1.3E+05	a	7.1E-01	a	7.8E-02	a	1.6E-01	25	b	1.4E+02	a	1.3E+03	a	0.00E+00		2.86E-01	
79-00-5	1,1,2 - TCA	1.3E+05	a	3.7E-02	a	7.8E-02	a	3.1E-02	25	b	7.5E+01	a	4.4E+03	a	5.70E-02		4.00E-03	

References:

a EPA Region 9, Preliminary Remediation Goals (PRGs), 2000.
b U.S. National Library of Medicine Hazardous Substance Data Bank (HSDB), http://www.nlm.nih.gov/pubs/factsheets/hsdbfs.html
c Cal-EPA Office of Environmental Health Hazard Assessment (OEHHA), Toxicity Criteria Database and December 2000 California Cancer Potency Values, http://www.oehha.ca.gov/risk/chemicalDB/index.asp
d Risk Assessment Information System (RAIS) Toxicity & Chemical-Specific Factors Data Base, January 2001, http://risk.lsd.ornl.gov/cgi-bin/tox/TOX_select?select=csf
e Cal-EPA, Air Resources Board (ARB), Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values, October 10, 2000, http://www.arb.ca.gov/ab2588/riskassess.htm

Toxicity Value reference priority:
1. Cal-EPA Office of Environmental Health Hazard Assessment (OEHHA), Toxicity Criteria Database and December 2000 California Cancer Potency Values, http://www.oehha.ca.gov/risk/chemicalDB/index.asp
2. Cal-EPA, Air Resources Board (ARB), Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values, October 10, 2000, http://www.arb.ca.gov/ab2588/riskassess.htm
3. EPA Region 9, Preliminary Remediation Goals (PRGs), 2000.

Vapor Migration Model Result

PL-B1 Deep Soil Volatilization to Indoor Air

SUMMARY OF VAPOR MIGRATION RESULTS - COMMERCIAL/LIGHT INDUSTRIAL SCENARIO
BRC Former C-6 Facility, Los Angeles, California
PL-B1 Deep Soil Volatilization to Indoor Air

Soil

CAS No.	Chemical	Estimated Concentration in Soil (mg/kg)	Cancer Risk	Hazard Index
104-51-8	n-Butylbenzene	3.1	No Slope Factor	0.00084
100-41-4	Ethylbenzene	5	No Slope Factor	0.00017
103-65-1	n-Propylbenzene	2.5	No Slope Factor	0.00068
95-63-6	1,2,4-Trimethylbenzene	45	No Slope Factor	0.023
108-67-8	1,3,5-Trimethylbenzene	15	No Slope Factor	0.047
108-88-3	Toluene	0.69	No Slope Factor	0.00020
1330-20-7	Xylene	28	No Slope Factor	0.0023
	Total		0.0E+00	0.075

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: n-butylbenzene

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	1.30E+05	mg/mole
Vapor pressure	VP	=	1.32E-03	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=		ug/l
Henry's Law Constant	H	=	5.40E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**0.00E+00**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=	3.10E+00	mg/kg
Henry's Law Constant	H	=	5.40E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	2.80E+03	cm3/gm
Soil/water distribution coef.	K_d	=	**1.12E+01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**1.47E+02**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 1.47E+02 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.50E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**6.02E-03**	cm2/sec
Depth of contamination or Csg	X	=	6.10E+00	m
Calculated Flux	**F_x**	=	**5.22E-02**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT				
Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**2.58E-04**	**mg/m3**
B. OUTDOOR AIR COMPONENT				
Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	**C_t**	=	**2.58E-04**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**3.00E-06**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**8.41E-06**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	8.41E-06	mg/kg-day
Reference dose	RfD	=	1.00E-02	mg/kg-day
Hazard Index	**HI**	=	**8.41E-04**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	3.00E-06	mg/kg-day
Slope factor (potency)	SF	=	0.00E+00	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**No Slope Factor**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: Ethylbenzene

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	1.10E+05	mg/mole
Vapor pressure	VP	=	1.26E-02	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=		ug/l
Henry's Law Constant	H	=	3.20E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**0.00E+00**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=	5.00E+00	mg/kg
Henry's Law Constant	H	=	3.20E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	2.00E+02	cm3/gm
Soil/water distribution coef.	K_d	=	**8.00E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**1.67E+03**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 1.67E+03 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.50E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**6.02E-03**	cm2/sec
Depth of contamination or Csg	X	=	6.10E+00	m
Calculated Flux	**F_x**	=	**5.92E-01**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT				
Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**2.92E-03**	**mg/m3**
B. OUTDOOR AIR COMPONENT				
Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	**C_t**	=	**2.92E-03**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**3.40E-05**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**9.54E-05**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	9.54E-05	mg/kg-day
Reference dose	RfD	=	5.71E-01	mg/kg-day
Hazard Index	**HI**	=	**1.67E-04**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	3.40E-05	mg/kg-day
Slope factor (potency)	SF	=	0.00E+00	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**No Slope Factor**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: n-propylbenzene

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	1.20E+05	mg/mole
Vapor pressure	VP	=	1.32E-03	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=		ug/l
Henry's Law Constant	H	=	5.40E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**0.00E+00**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=	2.50E+00	mg/kg
Henry's Law Constant	H	=	5.40E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	2.80E+03	cm3/gm
Soil/water distribution coef.	K_d	=	**1.12E+01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**1.18E+02**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 1.18E+02 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.50E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**6.02E-03**	cm2/sec
Depth of contamination or Csg	X	=	6.10E+00	m
Calculated Flux	**F_x**	=	**4.21E-02**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT				
Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**2.08E-04**	**mg/m3**
B. OUTDOOR AIR COMPONENT				
Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	**C_t**	=	**2.08E-04**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**2.42E-06**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**6.78E-06**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	6.78E-06	mg/kg-day
Reference dose	RfD	=	1.00E-02	mg/kg-day
Hazard Index	**HI**	=	**6.78E-04**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	2.42E-06	mg/kg-day
Slope factor (potency)	SF	=	0.00E+00	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**No Slope Factor**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: 1,2,4 - Trimethylbenzene

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	1.20E+05	mg/mole
Vapor pressure	VP	=	2.76E-03	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=		ug/l
Henry's Law Constant	H	=	2.30E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**0.00E+00**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=	4.50E+01	mg/kg
Henry's Law Constant	H	=	2.30E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	3.70E+03	cm3/gm
Soil/water distribution coef.	K_d	=	**1.48E+01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**6.93E+02**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 6.93E+02 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.50E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**6.02E-03**	cm2/sec
Depth of contamination or Csg	X	=	6.10E+00	m
Calculated Flux	**F_x**	=	**2.46E-01**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT				
Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**1.22E-03**	**mg/m3**
B. OUTDOOR AIR COMPONENT				
Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	**C_t**	=	**1.22E-03**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**1.41E-05**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**3.97E-05**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	3.97E-05	mg/kg-day
Reference dose	RfD	=	1.70E-03	mg/kg-day
Hazard Index	**HI**	=	**2.33E-02**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	1.41E-05	mg/kg-day
Slope factor (potency)	SF	=	0.00E+00	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**No Slope Factor**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: 1,3,5 - Trimethylbenzene

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	1.20E+05	mg/mole
Vapor pressure	VP	=	3.26E-03	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=		ug/l
Henry's Law Constant	H	=	3.20E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**0.00E+00**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=	1.50E+01	mg/kg
Henry's Law Constant	H	=	3.20E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	8.20E+02	cm3/gm
Soil/water distribution coef.	K_d	=	**3.28E+00**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**1.40E+03**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 1.40E+03 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.50E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**6.02E-03**	cm2/sec
Depth of contamination or Csg	X	=	6.10E+00	m
Calculated Flux	**F_x**	=	**4.96E-01**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT				
Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**2.45E-03**	**mg/m3**
B. OUTDOOR AIR COMPONENT				
Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	**C_t**	=	**2.45E-03**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**2.85E-05**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**7.99E-05**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	7.99E-05	mg/kg-day
Reference dose	RfD	=	1.70E-03	mg/kg-day
Hazard Index	**HI**	=	**4.70E-02**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	2.85E-05	mg/kg-day
Slope factor (potency)	SF	=	0.00E+00	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**No Slope Factor**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: Toluene

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	9.20E+04	mg/mole
Vapor pressure	VP	=	3.74E-02	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=		ug/l
Henry's Law Constant	H	=	2.70E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**0.00E+00**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=	6.90E-01	mg/kg
Henry's Law Constant	H	=	2.70E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	1.40E+02	cm3/gm
Soil/water distribution coef.	K_d	=	**5.60E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**2.62E+02**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 2.62E+02 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	8.70E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**6.98E-03**	cm2/sec
Depth of contamination or Csg	X	=	6.10E+00	m
Calculated Flux	**F_x**	=	**1.08E-01**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT				
Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**5.34E-04**	**mg/m3**
B. OUTDOOR AIR COMPONENT				
Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	**C_t**	=	**5.34E-04**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**6.20E-06**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**1.74E-05**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	1.74E-05	mg/kg-day
Reference dose	RfD	=	8.57E-02	mg/kg-day
Hazard Index	**HI**	=	**2.03E-04**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	6.20E-06	mg/kg-day
Slope factor (potency)	SF	=	0.00E+00	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**No Slope Factor**	

Project Name: BRC Former Boeing C-6 Facility, Los Angeles, California

Chemical: Xylenes

Variable Descriptions				**Units**
CALCULATION OF SOIL GAS CONCENTRATION				
A. SOURCE - Free Product/Soil>100mg/kg.				
Mole fraction	MF	=	0.00E+00	dimensionless
Molecular weight	MW	=	1.10E+05	mg/mole
Vapor pressure	VP	=	1.05E-02	atm
Universal gas constant	R	=	8.20E-05	atm-m3/mole-K
Temperature	T	=	2.93E+02	K
Calculated soil gas concentration	**C_{sg}(fp)**	=	**0.00E+00**	**mg/m3**
B. SOURCE - Groundwater				
Water contamination level	C_w	=		ug/l
Henry's Law Constant	H	=	3.00E-01	dimensionless
Calculated soil gas concentration	**C_{sg}(gw)**	=	**0.00E+00**	**mg/m3**
C. SOURCE - Soil < 100 mg/kg				
Soil contamination level	C_t	=	2.80E+01	mg/kg
Henry's Law Constant	H	=	3.00E-01	dimensionless
Bulk density (dry)	ρ_b	=	1.50E+00	gm/cc
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Water-filled porosity	θ_w	=	1.50E-01	dimensionless
Weight fraction of organic carbon	f_{oc}	=	4.00E-03	dimensionless
Organic carbon partition coefficient	K_{oc}	=	2.00E+02	cm3/gm
Soil/water distribution coef.	K_d	=	**8.00E-01**	cm3/gm
Calculated soil gas concentration	**C_{sg}(s)**	=	**8.78E+03**	**mg/m3**
D. SOURCE - Measured Soil Gas				
Measured soil gas concentration	**C_{sg}(m)**	=		**mg/m3 (ug/l)**

E. SOIL GAS CONCENTRATION USED IN RISK CALCULATIONS >>>> 8.78E+03 mg/m3

DIFFUSIVE TRANSPORT UPWARD IN UNSATURATED ZONE				
Total porosity	θ	=	4.34E-01	dimensionless
Air-filled porosity	θ_a	=	2.84E-01	dimensionless
Diffusion coefficient in air	D_a	=	7.00E-02	cm2/sec
Effective diffusion coefficient	**D_e**	=	**5.62E-03**	cm2/sec
Depth of contamination or Csg	X	=	6.10E+00	m
Calculated Flux	**F_x**	=	**2.91E+00**	**mg/m2-hour**

CALCULATING VAPOR CONCENTRATION IN BUILDING

A. INDOOR AIR COMPONENT

Floor area of building	A	=	9.68E+02	m2
% of floor area that flux occurs			1.00E+00	dimensionless
Attenuation factor(Crack factor)	S_b	=	1.00E-02	dimensionless
Flux area within building	Af	=	**9.68E+00**	m2
Interior Height of building	R_h	=	2.44E+00	m
Volume of building	V	=	**2.36E+03**	m3
Exchange rate of air	E	=	8.30E-01	exchanges/hr
Ventilation rate	Q	=	**1.96E+03**	m3/hr
Indoor air component	**C_i**	=	**1.44E-02**	**mg/m3**

B. OUTDOOR AIR COMPONENT

Downwind contamination length	L	=		m
Wind speed	u	=		m/hr
Height of building openings (or height of breathing zone)	h	=		m
Outdoor air component	**C_o**	=	**0.00E+00**	**mg/m3**
C. TOTAL INDOOR AIR CONCENTRATION	**C_t**	=	**1.44E-02**	**mg/m3**

EXPOSURE SCENARIO

Body weight	BW	=	7.00E+01	kg
Inhalation rate	IR	=	2.00E+01	m3/day
Exposure duration	ED	=	2.50E+01	yrs
Hours per day	conversion		8.00E+00	hr/day
Exposure time	ET	=	**3.33E-01**	hr/24 hours
Days per week	conversion		2.50E+00	days/week
Weeks per year	conversion		5.00E+01	weeks/yr
Exposure frequency	EF	=	**1.25E+02**	days/yr
Averaging Time (carc. risk)	AT	=	2.56E+04	days
Averaging Time (non-carc. risk)	AT	=	**9.13E+03**	days
Chemical Intake (carc. risk)	**IT_c**	=	**1.67E-04**	**mg/kg-day**
Chemical Intake (non-carc. risk)	**IT_{nc}**	=	**4.69E-04**	**mg/kg-day**

NON-CARCINOGENIC RISK (Chronic Risk)

Chemical Intake (non-carc. risk)	**IT_{nc}**	=	4.69E-04	mg/kg-day
Reference dose	RfD	=	2.00E-01	mg/kg-day
Hazard Index	**HI**	=	**2.35E-03**	

CARCINOGENIC RISK

Chemical Intake (carc. risk)	IT_c	=	1.67E-04	mg/kg-day
Slope factor (potency)	SF	=	0.00E+00	1/(mg/kg-day)
Cancer Risk	**Risk**	=	**No Slope Factor**	

CHEMICAL PARAMETERS

CAS No.		MW (mg/mole)		H' (dimension-less)		Da (cm^2/sec)		VP (atm)	Temp. (°C)		K_{oc} (cm^3/g)		Water Solubility (mg/L-water)		CSF (inh) ($(mg/kg-day)^{-1}$)		Chronic RfD (inh) (mg/kg-day)	
127-18-4	Tetrachloroethylene (PCE)	1.7E+05	a	7.5E-01	a	7.2E-02	a	2.4E-02	25	b	2.7E+02	a	2.0E+02	a	2.1E-02	c	1.0E-02	e
75-09-2	Methylene Chloride	8.5E+04	a	9.0E-02	a	1.0E-01	a	5.7E-01	25	b	1.0E+01	a	1.3E+04	a	3.5E-03	c	1.1E-01	e
67-66-3	Chloroform	1.2E+05	a	1.5E-01	a	1.0E-01	a	2.6E-01	25	b	5.3E+01	a	7.9E+03	a	1.9E-02	c	8.6E-02	e
95-63-6	1,2,4 - Trimethylbenzene	1.2E+05	a	2.3E-01	a	7.5E-02	a	2.8E-03	25	b	3.7E+03	a	2.6E-01	a	0.00E+00		1.70E-03	
78-93-3	Methyl Ethyl Ketone	7.2E+04	a	1.1E-03	a	9.0E-02	a	1.2E-01	25	b	4.5E+00	a	2.7E+05	a	0.00E+00		1.43E-01	
71-43-2	Benzene	7.8E+04	a	2.3E-01	a	8.8E-02	a	1.2E-01	25	b	6.2E+01	a	1.8E+03	a	1.00E-01		1.71E-02	
75-15-0	Carbon disulfide	7.6E+04	a	1.2E+00	a	1.0E-01	a	4.7E-01	25	b	4.6E+01	a	1.2E+03	a	0.00E+00		2.00E-01	
56-23-5	Carbon tetrachloride	1.5E+05	a	1.2E+00	a	7.8E-02	a	1.5E-01	25	b	1.5E+02	a	7.9E+02	a	1.50E-01		1.14E-02	
156-59-2	cis-1,2-Dichloroethylene (cis 1,2-DCE)	9.7E+04	a	1.7E-01	a	7.4E-02	a	2.4E-04	20	b	3.6E+01	a	3.5E+03	a	0.00E+00		1.00E-02	
100-41-4	Ethylbenzene	1.1E+05	a	3.2E-01	a	7.5E-02	a	1.3E-02	25	b	2.0E+02	a	1.7E+02	a	0.00E+00		5.71E-01	
98-82-8	Isopropyl-benzene (cumene, 1-methyethyl benzene)	1.2E+05	a	4.9E+01	a	7.5E-02	a	5.9E-03	25	b	2.2E+02	a	6.1E+01	a	0.00E+00		1.10E-01	
75-01-4	Vinyl chloride	6.3E+04	a	1.1E+00	a	1.1E-01	a	3.5E+00	25	b	1.9E+01	a	2.8E+03	a	2.70E-01		7.43E-03	
1330-20-7	Xylenes	1.1E+05	a	3.0E-01	a	7.0E-02	a	1.1E-02	25	b	2.0E+02	a	1.6E+02	a	0.00E+00		2.00E-01	
104-51-8	n-butylbenzene	1.3E+05	a	5.4E-01	a	7.5E-02	a	1.3E-03	23	d	2.8E+03	a	1.4E+01	a	0.00E+00		1.00E-02	
135-98-8	sec-butylbenzene	1.3E+05	a	7.7E-01	a	7.5E-02	a	1.4E-03	20	d	2.2E+03	a	1.7E+01	a	0.00E+00		1.00E-02	
103-65-1	n-propylbenzene	1.2E+05	b	5.4E-01	a	7.5E-02	a	1.3E-03	6.3	b	2.8E+03	a	1.4E+01	a	0.00E+00		1.00E-02	
108-88-3	Toluene	9.2E+04	a	2.7E-01	a	8.7E-02	a	3.7E-02	25	b	1.4E+02	a	5.3E+02	a	0.00E+00		8.57E-02	
156-60-5	trans-1,2-Dichloroethylene (trans-1,2-DCE)	9.7E+04	a	3.8E-01	a	7.1E-02	a	5.2E-01	30	b	3.8E+01	a	6.3E+03	a	0.00E+00		2.00E-02	
79-01-6	Trichloroethlyene (TCE)	1.3E+05	a	4.2E-01	a	7.9E-02	a	7.6E-02	20	b	9.4E+01	a	1.1E+03	a	1.00E-02		1.71E-01	
75-69-4	Trichlorofluoromethane (Freon 11)	1.4E+05	a	4.0E+00	a	8.7E-02	a	1.0E+00	25	b	1.6E+02	a	1.1E+03	a	0.00E+00		2.00E-01	
108-10-1	4-Methyl-2-pentanone (MIBK)	1.0E+05	a	5.7E-03	a	7.5E-02	a	2.6E-02	25	b	1.3E+02	a	1.9E+04	a	0.00E+00		2.29E-02	
108-67-8	1,3,5 - Trimethylbenzene	1.2E+05	a	3.2E-01	a	7.5E-02	a	3.3E-03	25	b	8.2E+02	a	5.0E+01	a	0.00E+00		1.70E-03	
75-34-3	1,1 - Dichloroethane (1,1-DCA)	9.9E+04	a	2.3E-01	a	7.4E-02	a	3.1E-01	25	b	5.3E+01	a	5.1E+03	a	5.70E-03		1.40E-01	
107-06-2	1,2-Dichloroethane (EDC)	9.9E+04	a	4.0E-02	a	1.0E-01	a	1.1E-01	25	b	3.8E+01	a	8.5E+03	a	7.00E-02		1.14E-01	
75-35-4	1,1-Dichloroethylene (1,1-DCE)	9.7E+04	a	1.1E+00	a	9.0E-02	a	7.8E-01	25	b	6.5E+01	a	2.3E+03	a	1.75E-01		2.00E-02	
71-55-6	1,1,1-Trichloroethane (1,1,1-TCA)	1.3E+05	a	7.1E-01	a	7.8E-02	a	1.6E-01	25	b	1.4E+02	a	1.3E+03	a	0.00E+00		2.86E-01	
79-00-5	1,1,2 - TCA	1.3E+05	a	3.7E-02	a	7.8E-02	a	3.1E-02	25	b	7.5E+01	a	4.4E+03	a	5.70E-02		4.00E-03	

References:

a EPA Region 9, Preliminary Remediation Goals (PRGs), 2000.
b U.S. National Library of Medicine Hazardous Substance Data Bank (HSDB), http://www.nlm.nih.gov/pubs/factsheets/hsdbfs.html
c Cal-EPA Office of Environmental Health Hazard Assessment (OEHHA), Toxicity Criteria Database and December 2000 California Cancer Potency Values, http://www.oehha.ca.gov/risk/chemicalDB/index.asp
d Risk Assessment Information System (RAIS) Toxicity & Chemical-Specific Factors Data Base, January 2001, http://risk.lsd.ornl.gov/cgi-bin/tox/TOX_select?select=csf
e Cal-EPA, Air Resources Board (ARB), Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values, October 10, 2000, http://www.arb.ca.gov/ab2588/riskassess.htm

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1. Cal-EPA Office of Environmental Health Hazard Assessment (OEHHA), Toxicity Criteria Database and December 2000 California Cancer Potency Values, http://www.oehha.ca.gov/risk/chemicalDB/index.asp
2. Cal-EPA, Air Resources Board (ARB), Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values, October 10, 2000, http://www.arb.ca.gov/ab2588/riskassess.htm
3. EPA Region 9, Preliminary Remediation Goals (PRGs), 2000.